ON THE OCCURRENCE OF LEAF-EATING SAWFLIES ON CEREALS IN BRITAIN.

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Each season since 1918 numbers of leaf-feeding sawfly larvae have been taken during the months of June and July in both oat and wheat crops. The larvae feed along the edges of the blades during the day and usually cut off the upper portion (fig. 1).

Fig. 1. Wheat leaves damaged by larvae of *Dolerus* and *Pachynematus*.

Attempts to breed the adults from these succeeded in 1920 and 1921, two species having been found to be responsible for the damage, *Pachynematus clitellus*, Lep., and *Dolerus haematodis*, Klug, which were very kindly identified by the Rev. F. D. Morice. The larvae disappear from the fields during the latter half of July and pupate in the ground. Emergence of the sawflies takes place in the laboratory during the first half of May. From measurements of larvae indoors and in the field this closely corresponds with the time of emergence out of doors.

Species of both *Dolerus* and *Pachynematus* have been recorded in America as attacking cereals (1, 2).

Emergence of the adults began on 4th May and finished on 14th May, the pupae being in pots of soil undisturbed from the previous July but occasionally watered. All the specimens died within 24 hours of emergence except a female *Dolerus*, and this oviposited on a young wheat plant. As the imagines were removed to separate chambers after emergence and no two were ever allowed together, the eggs were produced parthenogenetically.

This female exhibited no great interest in life during the first few days, but squatted about on the young leaf and moved its position a few times a day. On the ninth day (23rd May), from 3 to 5 p.m. on a bright afternoon, the insect exhibited signs of excitement, running along the edges of the leaves with the antennae violently quivering. After inspecting a number of leaves she began the work of oviposition. She took up a position facing the stem of the plant, and after feeling for the edge of the leaf inserted the " saws " and made about a dozen quick movements of the abdomen. Then followed a short pause, presumably to deposit the egg, after which the point of the abdomen was lifted from the surface of the leaf. The whole operation took about half a minute, and after a few minutes pause she moved further along the leaf and repeated the process. The following day this female died. There was nothing to indicate the presence of eggs on the leaves, and at first it seemed doubtful whether any could have been laid. During the next few days the eggs began to enlarge, and the swellings along the margin of the leaves showed exactly the purpose of the sawing and the number of eggs laid (fig. 2). In all, 64 eggs were deposited by this insect. The

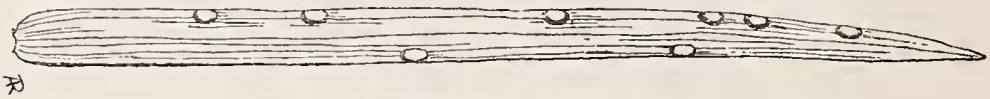

Fig. 2. Wheat leaf with swellings containing eggs of *Dolerus*.

leaf was cut along the margin for about 1 mm., severing the upper and lower epidermises. Both sides of the leaves were used, and the spacing was quite irregular. Fifteen was the highest number of eggs on any one leaf, and only a single egg occurred on several leaves.

The young larvae hatched on the third and fourth days (26th and 27th May) the eggs by then being 1·5 mm. long, the cavity 2 mm., and the height of the swelling 1 mm. In all cases the head end of the larva was down the leaf or towards the stem (fig. 3).

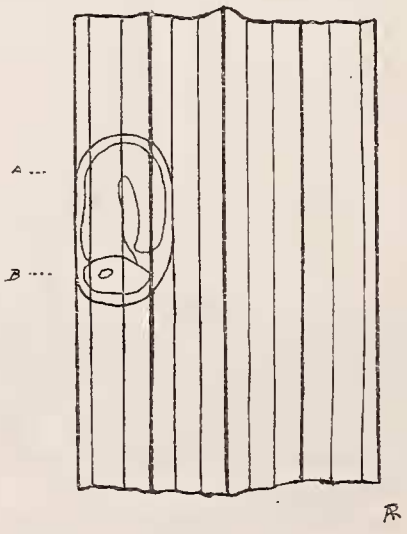

Fig. 3. Leaf rendered transparent to show position of egg and the larva within it ; the margin of the leaf is cut from A to B by the ♀.

It has so far been impossible to observe the oviposition in *Pachynematus* owing to the rapid death in captivity of the insects.

The young larvae were 2·5 mm. long and resembled the adults in coloration, being dark brown or nearly black along the back, with the lower part of the sides and the underside very pale, dull cream ; the vertex and eyes are black, the rest of the head pale. Full-grown larvae measure 17 mm. to 19 mm.

In addition to wheat and oats the larvae have been found on *Arrhenatherum avenaceum* (3), and Cameron, who figures and briefly describes the larva, states that it feeds on *Juncus effusus* and other species of *Juncus* and on *Scirpus lacustris* (4).

No larvae of *Pachynematus* under 8 mm. have been observed, when the coloration corresponds with the adult of 16–18 mm. Just before pupating there is a slight colour change to a uniform green. In addition to wheat and oats, *Poa trivialis* (3), *P. annua*, *Carex acuta* and other species of *Carex* and grasses are eaten (4). Cameron gives a full description of the larva, with a figure, and states that it is dimorphic. The larvae of both species lie almost motionless along the leaf-blades, although *Pachynematus* when alarmed is sometimes quite active.

Mature *Dolerus* larvae make no cocoon in the soil for pupation, but *Pachynematus* spins a thin brown cocoon. Cameron obtained cocoons in confinement on the leaves of the food-plants, but the writer was unable to do so ; the larvae simply remained inert during the winter and died in the early spring. The adults of both *Dolerus* and *Pachynematus* are common and apparently generally distributed. Both are fully described by Cameron, the latter under the name *Nematus capreae*. The amount of damage done by these species is slight, but they have regularly appeared during five seasons in different fields in the Newport district.

References.

1. Sanderson, " Insects Injurious to Staple Crops."
2. Riley & Marlatt, " Wheat and Grass Sawflies," Insect Life, vol. iv.
3. Miles, " Relation of Grass Insects to Cultivated Crops," Annals of Applied Biology, vol. viii, nos. 3, 4.
4. Cameron, " Monograph of the British Phytophagous Hymenoptera," vols. i and ii.